

NOTES ON SOME DRAGONFLIES OF SOUTH-
WEST PENINSULAR FLORIDA.

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After two winters spent on the lower gulf coast of Florida collecting dragonflies, I want to put on record some observations that I have made on a few of them. On that flat coastal plain, where open forests of slash pine once covered the drier soil and live oaks and palms still dominate the moister and richer soil in the low spots known as hammocks, there is permanent water only in the rivers, the lower reaches of the brooks and in a few of the larger ponds. In none of these is the water of any considerable depth. All the streams, as they near the sea, end in wide and sluggish estuaries of more or less brackish water. There are three types of environment that support the Odonate life of the region: ponds, streams, and the drainage ditches that have been made in the interests of agriculture.

The natural ponds in the pine flatwoods are very numerous, but most of them hold water only in the wet season, and so, are unsuited for dragonfly development. They are all more or less saucer-shaped, and few of them are of more than wading depth. On the higher ground about their borders there is generally a zone of saw palmettos. A zone of grass and other grass-like plants comes next, where the soil is always at least damp. Next comes a zone of arrowhead (*Sagittaria*) where the soil is nearly always saturated with water. Grass and arrowhead zones are often very wide. Their width varies with the gradient of the bottom. If deep enough at the center for open water, there may be patches of pickerel weed (*Pontederia*) or clumps of willow on the edges of it; and in the shoal water, massed polygonums or bonnets (*Nelumbo*), or scattered water lilies, partly floating; also such submerged aquatics as *Myriophyllum*, *Ceratophyllum*, *Chara* and *Utricularia*. In artificial ponds that have steeper banks, and in the edges of natural ponds where the water is deepened artificially, cat tails (*Typha*) come in and spread.

Ponds that are merely wet season pools yield no crop of dragonflies; and in this region of cattle pastures a good many that retain some water the year round are ruined for dragonfly production by the trampling of the bottom by the cattle.

Brackish water extends far up the mouths of streams. The salt content of the water varies with the distance from the gulf, with the drive of the tides, with the rainfall on the land, and with the

gradient of the stream bed. All are wide and shallow, largely lacking in water weeds, and very poor in Odonate life, harboring in their edges only a few of the hardier all-season species such as *Erythrodiplax berenice*, *E. minuscula*, *Anax junius*, *Ischnura ramburii* and *Anomalagrion hastatum*.

The drainage ditches farther inland, that carry excess rainwater into the streams, are often extensive breeding grounds for dragonflies. These ditches vary in size and depth according to the area drained. Many of them are reduced to isolated residual pools in the dry winter season. In these pools small fish are concentrated. Many roadside ditches are trampled by cattle and hogs that run at large; and the reduction in numbers of dragonflies by the jaws of carnivorous fishes and by the trampling of hooves makes such pools very poor collecting grounds for nymphs.

In all the foregoing places, both fresh water and brackish, there are to be found a few hardy species, wherever there is proper cover: the five above-mentioned by name, and three additional that are by far the commonest and most characteristic of this region; *Pachydiplax longipennis*, *Erythemis simplicicollis* and *Argia fumipennis*. The big *Anax* seems to prefer beds of erect emergent aquatics; *Erythemis*, the submerged weed tangles. *Anomalagrion* nymphs live in seepage water amid the close-growing stems of small spike-rushes and thin erect grasses.

It is not my purpose in this paper to chart the distribution in relation to habitat of the 40 species that I found during these two winters there, but only to record a few observations and experiences with three of them. However, I will first make mention of unexpected finds of four other species. I took a single half-grown nymph of *Aphylla williamsoni* from the soft black mud of a deep drainage ditch a few miles northeast of Englewood; also a single nymph of *Nasiaeschna pentacantha* from the mud of a smaller ditch near by.

I took a cast skin (an exuvia) of *Epicordulia regina* from the post of a highway bridge on Route U. S. 17 in Joshua Creek near Nocatee; and with the efficient help of Mr. William Hagener, I took a number of adults of this fine species as they skimmed over the slow-moving water of the creek near by. They were coursing low over the wider pools of the stream on more or less regular beats, and were not too difficult to catch. That was on May 4th. Heretofore I had seen this species only high in the air over open rivers.

I took *Perithemis seminole* from Trout Creek at bridge No. 6 on

Florida highway route No. 2 a few miles north of Olga. April 7th I got nymphs of this species from the water, exuviae from the stems of spider lilies that stood at the water's brink, and adults from the air. The only Odonate associate there, beside the ubiquitous *Pachydiplax longipennis*, was the pretty blue-lined *Argia sedula*. Trout Creek is a clear flowing sandy-bottomed stream of easy wading depth. It winds through deep oak woods.

I may mention incidentally that while plying my water net for *Perithemis*, I caught a number of small flat-fish (*achirus*) on the bed of this fresh-water stream.

Gynacantha nervosa.

This elusive species greeted me on my first evening at Englewood by flying about my head in an aisle in an orange grove. Its capture intrigued me. I had never caught one, nor even seen one alive before. Here it was, flying in what were to be my own haunts for an entire winter. I felt sure I would soon have a specimen; perhaps a good series.

There were two places where I could count on seeing a single *Gynacantha* flying at dusk on any clear calm evening in December: one was the above-mentioned lane through the orange grove; the other, a nearby apiary where it captured bees. I first tried the lane, and neatly missed an easy stroke at one that drifted near me. It kept on flying near me in the lane, soaring high, sweeping low, floating over my head, deliberately circling around my knees. Always my net, in close pursuit, would be a little bit too late.

When I failed to get it in the lane, I went over to the apiary and there was another one slowly floating along on the air in front of the hives. I slipped up on it and with a mighty stroke got it in my net. I took it out tenderly and was holding it by the legs when it bit me: gave me so sharp a nip with its jaws that my fingers relaxed for an instant; and I must have batted an eye, for it was gone so quickly and completely that I saw not a trace of it again; not even a vanishing shadow of it!

Then there came on a spell of very cold (near freezing) weather, and no more *Gynacanthas* were seen near at hand; but I kept on finding them through the winter, singly, in two warm hammocks several miles out of Englewood northward: two small islands of semitropic verdure, each set in a slight depression of the pine flatwoods. In each of these there was a heavy forest cover composed mainly of the crowns of very tall cabbage palms and wide-spreading live oaks. It was a cover that retained well the heat that the deep

black humus soil absorbs during hours of sunshine and it kept the nights warm. Both these hammocks were open stands of tall trees. Forest fires in former seasons had cleared them of underbrush. Even low hammocks will burn when enough dead palm leaves and other combustible materials have been accumulated, and a very dry season comes along. There was room enough under the cover for the sinuous flight of the *Gynacanthas* among the tree trunks.

I was able to visit these hammocks only about half a dozen times in all. Each time on entering I flushed a *Gynacantha* before I saw it. Each time I saw it in one flight only. It would fly waveringly around the periphery of the hammock at knee-to-head height. It would occasionally hover haltingly before openings in the surrounding wall of green vegetation. Then it would suddenly dash through one of the openings, not to be seen again.

My last chance of the season to get *Gynacantha* was in one of these hammocks: the one in which stands the big tree known as Hegener's Oak. It is a venerable live oak, about five feet in diameter, breast high. It is of very unusual form. I conjecture that it was overtopped and nearly crowded out in its youth: that it was able to push only two branches through the palm crowns above it, one eastward, the other westward; and that when these reached the light each developed enormously, its own way, gaining a spread of 100 feet or more. At any rate, it developed instead of the usual hemispheric live oak tree a high ∞ -shaped crown at the top of a massive Y-shaped trunk.

The palms and a hackberry or two have crowded in around it, and under their combined canopy there is developed one of the most tropical spots that I have seen in Florida. It is a delightfully cool nook to enter, when coming in out of the hot May midday sun. In it I caught *Heliconia* butterflies, and a dagger-wing, and a very unusual hair-streak; also a large white-footed crane fly (*Oropeza?*).

I was standing with Mr. and Mrs. Hegener beside the big oak when Mr. Hegener discovered a pair of *Acanthagyna* hanging up by their feet on a twig of a nearby evergreen shrub *in copulo*. The shrub was small; the pair was well within its circumference and there appeared to be but one open passageway where they probably entered and where we expected they would go out again. Quickly we formed our strategy. I was to place the net over that opening; Mr. Hegener was to drive the pair into the net. Slowly, very slowly I moved the open net over the opening. Slowly Mr. Hegener approached the bush from the opposite side with his coat flaps

spread out laterally like wings. Then the big rush ———! The net was empty; the bush was vacated, and none of us had had even a glimpse of the departing pair! So ended my efforts to catch *Gynacantha* that season.

The next season Mrs. Hegener took over. On January 10th, 1945, she appeared at the door of my study with a living *Gynacantha* in her hand, saying, "Would you care to have this specimen for your collection?" She had found it hung up by its feet under a projecting angle at the base of the building in which I was living, and only about a foot above the level of the ground; *and she had caught it with her fingers!* I was supposed to know how to catch dragonflies! My hat was off to Mrs. Gydde Jensen Hegener, my hostess and good friend.

This tawny-faced, thin-legged, gauzy-winged *Aeschnine* has in life a beauty of coloration that museum specimens have almost wholly lost. The green undertone of the front of the thorax, and the brighter green of the knobs at the wing bases and on all the prominences on the dorsum fade, and even the brown general ground color loses something of its softness. The eyes especially become lusterless. In life the ocelli are yellow. The very broad surface of the compound eyes (the area of the large facets) is dark brown; the lower part paler, with small blackish spots in three horizontal rows showing dimly through the transparent corneal layer.

This is indeed an interesting species: especially interesting for the fitness of its coloration for hanging up under cover by day and for flying only among the shadows of twilight.

Libellula needhami.

Nymphs of this species were often taken in the bottom mud of drainage ditches and at soft spots in the margins of ponds. They sprawl in the soft black mud. They are to be found by raking and sifting. Even after sifting they would be well-nigh undiscoverable amid the trash but for their habit of running to hide. They are generally so well plastered with mud that a preliminary washing is required before their specific structural characteres can be seen. I reared a number of them and have turned my reared material over to Mr. Minter J. Westfall, Jr., for description of the nymph. It has not hitherto been critically distinguished from closely related species.

Adults of this species were first seen by me on the wing on April 6th. On the shore of Lake Okechobee at Clewiston teneral were

then flying along with our two species of *Cannacria*: *C. grävda* and *C. herbida*. The first *Libellula* to transform in my rearing cages came out on April 19th. In the field they were becoming common from the end of May up to the time of my departure for the North in early June. I had seen no other species of *Libellula* in flight.

Macrodiplax balteata.

This tropical species has been reported from both the east and the west coasts of Florida, the nearest west coast station being Sanibel Island, off Ft. Myers, where Mr. M. J. Westfall, Jr., reported it as being common. I found nymphs of it about a hundred miles farther north at a pond in a dog race-track in the northeast corner of the city of Sarasota. This is an artificial pond made by widening and deepening a drainage ditch. It is something more than an acre in area, and of easy wading depth over most of that area. The bottom is sand. The water is very hard, somewhat sulphurous, but does not taste of salt. Except for a narrow open belt around the shoreline it is filled with a dense matted growth of Stonewort (*Chara*), with only a few tufts of ditchgrass (*Ruppia maritima*) interspersed. There was a scanty new growth of cattail (*Typha latifolia*) along one margin of the pond.

The nymphs were common in the matted chara. I could shake one out of almost every mass of it that I lifted from the water. Associated with them would occasionally be found a nymph of *Tramea* or a *Celithemis*, but these were few and far between. Nymphs of *Anax junius* were resident in the pond, but I found them only among the cattails near the shore; *Libellula needhami* nymphs also, but they were in the little mud-bottomed pockets at the margin.

It may well be that this surprising abundance of a tropical species so far north resulted from the chance coming of a wind-blown gravid female from the south. She could distribute her large burden of eggs well about on the surface of a pond that was not yet well stocked with enemies.

In all my aquatic collecting roundabout Sarasota in the spring of 1945 I found only a single nymph of *Macrodiplax* anywhere else than in this pond. That one came from a roadside ditch a few miles south of the city. It was taken from matted and partly submerged *Polygonum*, where there were many predacious waterbugs and beetles and a few nymphs of *Anax*, and of large *Libellulines*.

I described the nymph of this species in *Trans. Amer. Ent. Soc.*, 62: 111-112, 1936, jointly with Dr. Elizabeth Fisher. We had a

single nymph taken near Wilson, Florida, from the stomach of a duck. Our figure (fig. 3 of Pl. VI) shows the lateral spines on abdominal segments 8 and 9 strongly incurved. That incurvature of them in our specimen was probably due to compression within the duck's stomach; for fresh specimens, while agreeing with our account of the nymph in other respects, show these spines directed straight to rearward. It has not yet been reared, but the venation of the nymphal wings is clear and the identification is certain.

Insects of *Lupinus*.—The longhorned beetle, *Anoplodera instabilis* (Hald.) (det. J. N. Knull) was conspicuously abundant upon blossoming parts of the common bluish *Lupinus laxiflorus* Dougl. which occurs among sage and forest on top of Beaver Mountain, Utah, near Big Flat. Thirty specimens were collected in 15 minutes, one to three beetles occurring on blossoms of some plants in the sunny spots along the edge of the highway; these beetles were scarce on shaded *Lupinus* plants. Whenever beetles were dropped while being collected, or purposely dropped to watch their reactions, none attempted to fly; each immediately began to burrow among the leaves or rubble on the ground, usually getting out of sight within 20 to 30 seconds. Leaves above the beetles were agitated for 50 to 68 seconds. Sometimes a buzzing noise was made by the beetles when they were dropped. Beetles attempted to bite the collector when picked up with the hand; they hung tenaciously to the fingers when being placed in 1 × 8 inch pocket cyanide tubes. (Observations were made between 5:30 and 6:15 P.M. Mountain War Time.)

Other insects observed at this stop, on *Lupinus*, included a number of *Macrosiphum albifrons* Essig. One immature female of this aphid species was observed while being fed upon by a damsel bug, *Nabis roseipennis* Reuter. This predator dragged its prey into the cyanide bottle when captured.—G. F. KNOWLTON, Utah Agricultural Experiment Station, Logan, Utah.